

Phase II

Project Management Plan

California Minimum Essential Datasets (MEDS)

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Baker

California Minimum Essential Data Sets Map Services

Document Type: Phase II Project Management Plan

California Minimum Essential Datasets (MEDS)

Prepared for the California Office of the Chief Information Officer
and Geographic Information Officer

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1 Project Summary

1.1 OCIO MEDS Objectives

The State of California's Office of the Chief Information Officer (OCIO) Geographic Information Officer (GIO) envisioned the Minimum Essential Datasets project (MEDS) and obtained Federal Department of Homeland Security funding to initially architect and subsequently develop MEDS as a means to provide a common operating picture to all levels of government staff in California. MEDS will provide government agencies with access to core geospatial services to meet both emergency management and normal business requirements. The MEDS project will enable the State to publish geospatial data from the best available public sources and this data will provide the context to make other layers of geocoded data meaningful and usable to consumers with varying degrees of technical expertise.

The initial implementation of MEDS will serve up commonly used, publicly available landmarks, transportation, and imagery data. MEDS will also provide users with a nexus for sharing more up-to-date data and for receiving notifications when existing datasets have been updated. By encouraging data exchange, government users will be able to leverage data collected by multiple agencies.

MEDS will form the foundation for the next generation of geospatial data sharing within the State. Users of MEDS will include those with access to and experience with commercial off-the-shelf GIS software and users who will be able to benefit from MEDS by accessing data through web pages that take advantage of APIs and open source solutions to leverage MEDS to provide geospatial functionality.

The recommended implementation of MEDS is more than just a set of data services. While traditional GIS practitioners will be able to access an ESRI-based stack of data services (WMS, WFS, and WCS), users will also be able to access MEDS through WMTS and an open API. To address the need for distributing data to users in a non-connected or firewalled environment, MEDS will be available as both pre-packaged FTP downloads and as field-deployable USB disk drives.

1.2 Project Purpose

The primary purpose of this project will be to implement the MEDS Data Services using the data and architectural design recommended in Phase I.

1.3 Assumptions

- The California Geographic Information Officer will facilitate access to state-owned computer resources and will ensure the active cooperation of state IT staff for the purposes of implementing MEDS.
- Two core data centers will be available for data storage and web servicing hosting: NASA Ames Research Center and San Diego Supercomputer Center.
- A number of mirrored sites would be available for MEDS data downloads: Cal-Atlas may be an appropriate mirror site for downloads as it is already established and known as a resource. Other potential mirror sites might include the Hazard Data Distribution System (HDDS), National Interagency Fire Center (NIFC), Geomac, and others.
- Public web services such as Google Maps, Bing Maps, and Open Street Maps shall be available. MEDS solutions have no control over those services in terms of SLA (Service Level Agreement). There is an inherent risk of using any public service.
- There is a steward for each of the MEDS datasets. Per the Steering Committee Meeting Notes, CalEMA will be the Landmarks steward, Caltrans will be the Transportation steward and the USGS will be the Imagery steward.
- While the data stewards might also serve as hosts for their MEDS data, this is not a required role. A more robust solution may be for the stewards to simply maintain data and to regularly push their data to the core data centers for distribution. Benefits of this approach include taking advantage of the up-time, performance and bandwidth of the core data centers, reducing load on the stewards' infrastructure, and simplifying security and administration of the MEDS.

1.4 Inputs

- MEDS Final Functional Requirements (dated October 2nd, 2009).
- MEDS Final Design Specifications (dated October 23rd, 2009).
- MEDS 09/14/09 Steering Committee meeting notes.
- MEDS Final Data Availability Document (dated December 14th, 2009)
- MEDS Draft Proposed Architecture Design (dated December 31st, 2009)

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1.5 Project Team and Stakeholders

The MEDS project is strengthened by participation and cooperation between stakeholder agencies. The MEDS Steering Committee played a critical role in Phase I of MEDs and will continue to provide guidance and validation of Phase II. The Steering Committee members are listed in Table 1.

Table 1: MEDS Steering Committee

Name	Role	Phone (916)	E-mail
Mike Byrne, GISP	California GIO Project Sponsor	403-9630	Michael.Byrne@CIO.ca.gov
Scott Paterson, PMP	California OCIO Project Manager	403-9619	Scott.Paterson@CIO.ca.gov
Diane Vaughan, CalEMA	Steering Committee Member Key Client	845-8542	Diane.Vaughan@oes.ca.gov
Gary Darling, GISP, OCIO	Steering Committee Member	403-9625	Gary.darling@cio.ca.gov
Carol Ostergren, CA USGS Liaison	Steering Committee Member	278-9510	costergren@usgs.gov
Coco Briseno, Caltrans	Steering Committee Member	654-6980	coco_briseno@dot.ca.gov
Joe Concannon, Supervising Research Analyst, Sacramento Area Council of Governments	Steering Committee Member	340-6234	jconcannon@sacog.org
Terrence Newsome, CalEMA	Steering Committee Member	324-8569	Terrence.Newsome@ohs.ca.gov
David Harris, Natural Resources Agency	Steering Committee Member	445-5088	David.Harris@resources.ca.gov

1.6 Requirements Summary

To establish functional requirements for MEDS, Baker developed an online survey, held a series of four workshops throughout California and discussed prioritization of the requirements with the MEDS Steering Committee. Stakeholders from all levels of government participated in both the survey and in the workshop round-table discussions. These activities identified the core functional requirements for MEDS. The initial MEDS scope focuses on three specific datasets: landmarks, transportation and imagery.

The MEDS solution must be robust, scalable and accessible. Redundant hosting centers with load balancing are required to provide robust and stable service. Scalability during emergency events is a core requirement. Further, the flexibility of interaction with the datasets will be a critical factor in the acceptance and utilization of MEDS across the highly diverse user community. Data access requirements include OGC-compliant data services (WMS, WFS and WCS), direct query and rendering of the spatially-enabled relational database and Really Simple Syndication (RSS) feeds. In addition to access to the data services, the stakeholders require a notification process that allows users to communicate the availability of newly updated datasets to MEDS and a process that allows users to be notified of new content that has been loaded to MEDS.

The security requirements for MEDS are primarily for restricting access to government agencies to assist in controlling demand on the system. MEDS data is not intrinsically sensitive.

It is not enough for MEDS to simply provide access to data services as graphic layers; the datasets must also be accessible through Application Programming Interfaces (APIs). The usability and value of MEDS will be greatly enhanced by the availability of an easily understandable and readily accessible API. Application developers will be able to use the API to develop custom functionality against the MEDS data services.

Although the initial MEDS scope was focused on data services as provided through internet connectivity, stakeholders in the emergency management arena clearly identified a requirement for disconnected access to MEDS data. One driver for this requirement was that emergency management operations require data to be stored on site for normal operations. The ability to download MEDS data via FTP will satisfy this requirement. The second driver was that in the aftermath of an event, computer networks may be down or may be overloaded with traffic. The availability of an established methodology and in-place mechanisms ready to deliver the most recently updated MEDS data to agencies in the field in the affected area is of high interest to the stakeholders. The “Sneakernet” component of MEDS will satisfy this requirement.

More detailed discussion of MEDS requirements can be found in the Final Functional Requirements Document.

1.7 Data Summary

The initial MEDS datasets were determined based on evaluation of the best available statewide, publicly available data for each of the three data domains. Detailed information about the publicly available data inventoried for MEDS is available in the Final Data Availability Document. The following sections summarize the data to be used for MEDS and the approximate size of each data set.

1.7.1 Landmarks

Two distinct sources will form the basis of landmarks for MEDS. The existing Geographic Names Information System (GNIS) from the USGS and parcel points being developed by the California Board of Equalization (BOE) both provide statewide points of interest that can be used as landmarks.

The GNIS database contains over 115,000 point landmark entries for California. The GNIS is the United State's official repository of domestic geographic names information. It was developed by the U.S. Geological Survey in co-operation with the U.S. Board on Geographic Names (BGN) to promote the standardization of feature names. The GNIS data set is estimated to be XXXX MB.

Parcel data from the BOE is available as parcel polygons with 18 core attributes which will be processed into Parcel Points for the initial implementation of MEDS. The Parcel Points dataset is estimated to be XXX MB.

1.7.2 Transportation

The U.S. Census's Topologically Integrated Geographic Encoding and Referencing (TIGER) dataset will be used as the initial MEDS transportation dataset. TIGER centerlines are the only publicly-available source of a seamless, comprehensive road dataset for all of California. The TIGER Transportation data set is estimated to be XXXX MB.

1.7.3 Imagery

Two sources of imagery will initially be used for MEDS. The USDA National Agricultural Imagery Program (NAIP) data will provide a base layer of seamless statewide imagery. This dataset is typically updated once every three years. The most recent NAIP (captured 2009) will be available as TIF files in February 2010. Estimated size of the native TIFFs for NAIP is 2.5 TB.

In addition, High Resolution imagery is available for many California urban areas. This imagery is typically collected in cooperation with the USGS's imagery program. The total disk size of the publicly available HiRes imagery inventoried for MEDS is approximately 10 TB.

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Driving Baker’s architecture recommendations are the Functional Requirements document which captured California geospatial community input and Steering Committee guidance that access to MEDS data services must be made as easy as possible to the widest possible government audience and that technological barriers to access must be minimized or eliminated. Thus the “technology stacks” that are recommended include substantial open source solutions for maximum accessibility, yet also recognize the large investments in commercial software products and staff training that already exist in government agencies throughout California.

The recommended implementation of MEDS is more than just a set of data services. While traditional GIS practitioners will be able to access an ESRI-based stack of data services (WMS, WFS, and WCS), users will also be able to access MEDS through WMTS and an open API. To address the need for distributing data to users in a non-connected or firewalled environment, MEDS will be available as both pre-packaged FTP downloads and as field-deployable USB disk drives.

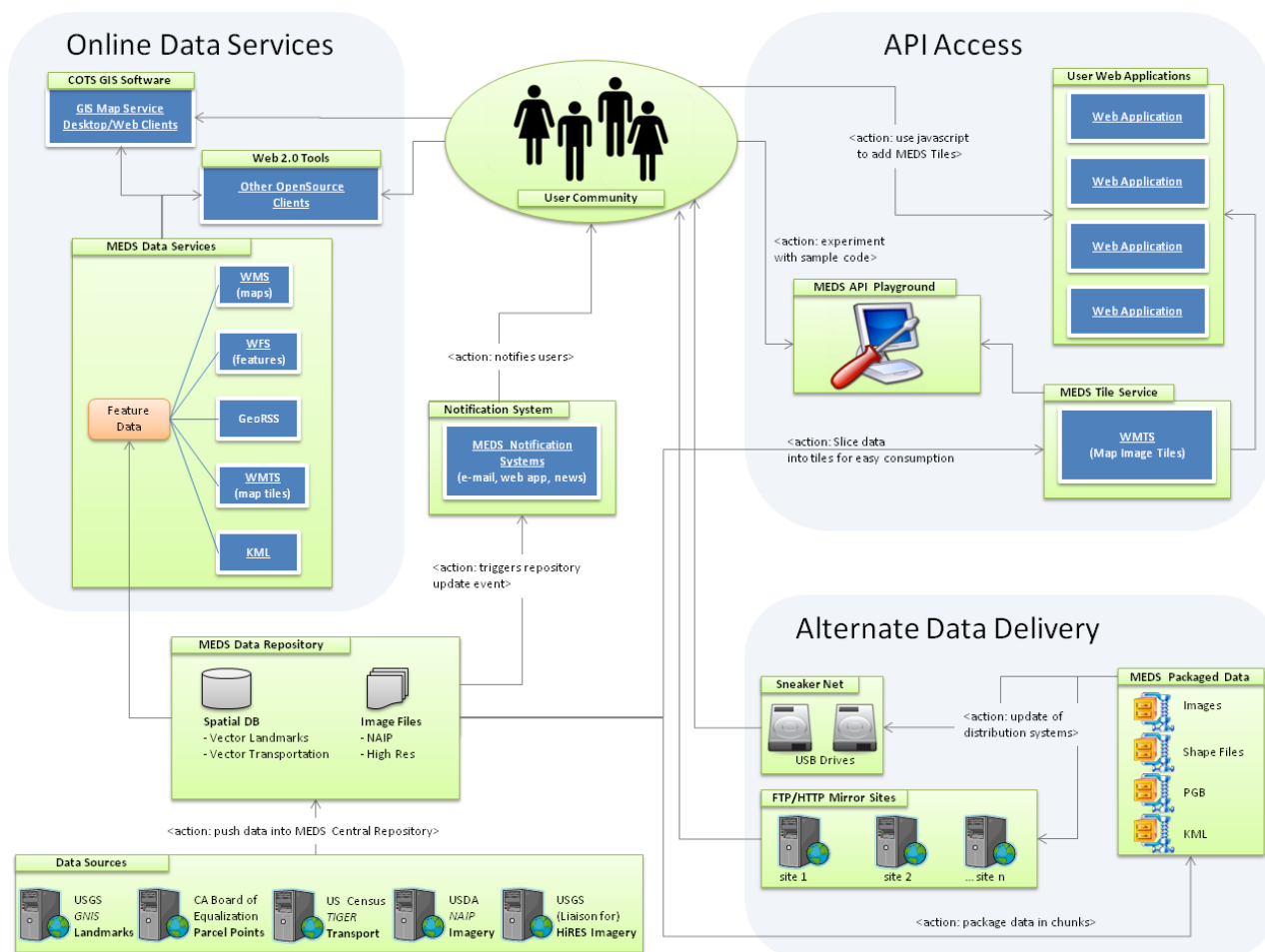


Figure 1. MEDS Components

The following list summarizes the components recommended for implementation. Additional detail on each component can be found in the System Architecture Document.

1.8.1 Technology Stacks

- **Data Repository**
 - Relational Database for vector data storage(Oracle 10g or SQL Server)
 - Postgres SQL 8.4 with PostGIS for Windows
- **Data Services**
 - ArcServer 9.3 (for WMS, WFS and WCS)
 - Google Fusion
 - Google Earth Server
 - Microsoft IIS with port 80 open
- **Website**
 - Drupal 5.2 for Windows
 - Apache 2.2 for Windows. An open port is needed for the web server.
 - Python 2.5 for Windows
 - PostgreSQL 8.4 for Windows
 - PHP 5 for Windows
 - Joomla for content management
- **Application Programming Interfaces (APIs)**
 - Sun Application Server 9.x for Windows (open source application server)
 - Glassfish Web Server 3.x for Windows (open source web server)
- **Data Distribution**
 - Any FTP software that allows secured FTP access.
 - Minimum T1 connection
 - Flat File server (for hosting imagery tiles and pre-packaged GIS data for distribution)

1.9 Pilot

The MEDS Pilot is a proof of concept to demonstrate the data services and to showcase selected technologies. Not all recommended architecture components are demonstrated in the Pilot. The Pilot framework is a Drupal-based website that wraps around several functional web pages to demonstrate accessing MEDS in a variety of ways.

The first tab of the website demonstrates access to MEDS via open source methods. The second tab demonstrates access to the standard ESRI ArcServer-generated data services (WMS, WFS, WCS). Both of the first two tabs utilize OpenLayers to facilitate mash-up of MEDS data with GoogleMaps or Bing. The final tab showcases the API capabilities and interacts with the first tab. A frame in the upper left pulls in Google StreetView and the frame in the lower left displays textual results. The functionality demonstrated by each tab is discussed further in the following sections.

1.9.1 Tab 1 -- Web Map Tile Service (WMTS)

This tab demonstrates pulling MEDS data directly from the spatially-enabled relational database (Oracle in the Pilot) via PostgreSQL and then rendering on-the-fly generated map tiles that are overlaid on Google Maps. This approach avoids overhead that can be incurred with the more traditional ArcServer method of delivering data services. The trade-off for this boost in performance is that functionality must be coded as needed.

This tab is also used to demonstrate the end-user experience with API functionality. By selecting a radius and clicking on the map, a user is returned a list of GNIS landmarks within the radius. The clicked point and the area of query are graphically rendered on the map and the list of results is returned in the lower left frame. This list of results is grouped by landmark type. The user can click on a specific landmark in the lower left frame and that point will be tagged with an identification balloon in the map frame. The functionality displayed here is simply a starting point for exploration; the API allows application developers free reign to design code that sends requests to the relational database via Postgres and receives results to support any number of specific functions as required by MEDS users.

Graphic to be inserted in FINAL

Figure 2. Pilot Interface

1.9.2 Tab 2 – WMS, WFS, WCS

Tab 2 is a straight-forward demonstration of consuming WMS, WFS and WCS in a web-based mashup. In the Pilot, ArcServer-generated services are mashed up with Bing maps. The advantage of using ArcServer is essentially that existing functionality written into the ArcServer application can be implemented without the necessity of developing additional code. As an example, the native ESRI identify function can be implemented by clicking on the map interface. The returned results are displayed in a pop-up window provided by ESRI code. If a particular application can leverage existing native functionality, the availability of the ArcServer function library may be advantageous.

The services demonstrated in Tab 2 can also be consumed by many standard COTS GIS software packages, including ArcGIS.

1.9.3 Tab 3 – API Playground

Tab 3 reveals the request being sent to the API from Tab 1 as a result of the click event and the results returned by the function.

Graphic to be inserted in FINAL

Figure 3. MEDS API Tab

The text string results in the bottom pane are returned in JavaScript Object Notation (JSON) by the function. The interface shown in the Pilot allows the user to modify the text in the query string, resubmit the updated query and see the returned JSON results. JSON is a self-describing format (<http://www.json.org/>).

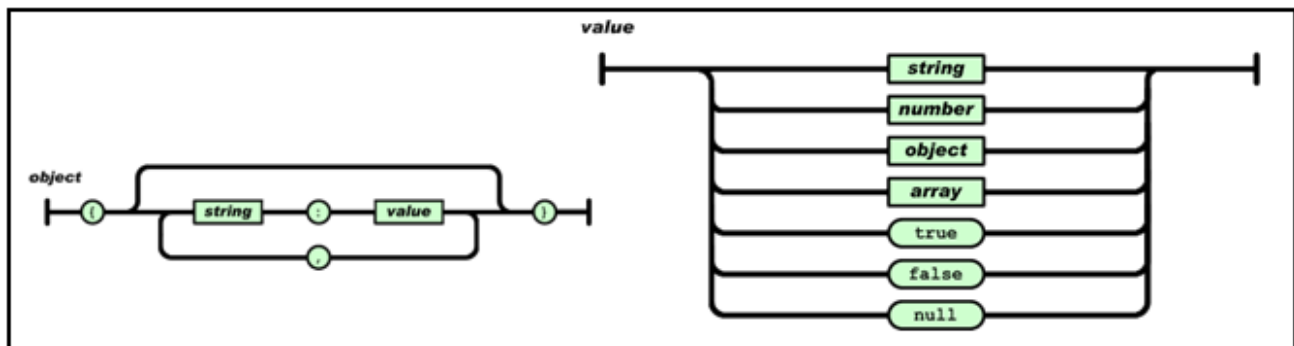


Figure 4. JSON data interchange format examples

Once an updated function call is executed in Tab 3, the user can switch back to Tab 1 and see the graphically rendered results of the updated query. This API playground provides a rich and intuitive experience for users that want to understand the capabilities of functions that can be developed to take advantage of the API.

ADD/UPDATE SCREENSHOTS IN FINAL

1.10 Architectural Strategy Statement

To meet the MEDS core requirements of a robust, scalable architecture, a combination of technologies has been recommended. We recommend this flexible suite of solutions to take advantage of the strengths of each, while meeting the needs of California's diverse stakeholder community. By providing access to data services and geospatial functionality as open source-based and ESRI-based, we allow MEDS users to consume data and create functionality in whichever way offers the lowest barrier to entry and the easiest implementation in their existing environment. It recognizes the broad appeal of open source to the developer and academic community, while acknowledging the substantial investment with commercial-off-the-shelf GIS software within government agencies across California.

The need to serve MEDS to all technical expertise levels, from end users to developers, further reinforces the strength of a multi-pronged approach to MEDS data services access. Keeping the system compatible with other external data sources via OpenLayers allows visualization of MEDS as an overlay on Google Maps/Earth, Bing or other commonly used systems and gives MEDS the ability to easily mash-up data that may be served by non-MEDS sources.

By wrapping MEDS in an Open Source Web Interface such as Drupal, we allow communication with low-bandwidth protocols, such as RSS, which we see as a potentially significant player in the mobile environment.

2 Implementation Roadmap

2.1 Activities for Implementation Scope of Work

It is anticipated that the implementation work may potentially be performed by more than one Implementation resource. The State may choose to perform certain tasks in-house, delegate certain tasks to the data centers, and retain a third party consultant. Both the initial build and MEDS ongoing maintenance should be considered when assigning resources. This section is offered as a guideline summarizing the tasks that are required for MEDS implementation.

2.1.1 Work Activities

This section provides a description of the work that will be performed by the various Implementation resources for the OCIO. Implementation resources will perform work under the direction of the OCIO Project Sponsor and Project Manager, working within the available time and budget constraints. To be successful, the Implementation resources will have these general responsibilities:

- All activities will include documentation of processes used and source code implemented (if applicable).
- All deliverables will be submitted as draft for review by the OCIO Project Management Team. Acceptable timelines for draft review will be established by the OCIO Project Management Team and the Implementation team.
- The Implementation team will provide labor resources supporting the proposed project plan and milestones.
- The Implementation team will provide a Project Manager responsible for reporting to the OCIO Project Manager. The Implementation team Project Manager will provide the OCIO Project Manager with weekly and monthly status reports that will include the deliverable schedule, budget, and any identified risks to the project.
- The Implementation team will be responsible for providing input to risk mitigation planning.

The following are specific activities which must be preformed to implement MEDS:

Identify and Retain Internal Implementation Team Resources

Identify and Retain External Implementation Team Resources

Purchase Hardware and Software

The hardware and software to be purchased depends upon the hosting solution that the State selects. If, as we assume, the two data centers, AMES and SDSC, are selected as the hosting solution, then the COLO solution previously discussed will require, at a minimum, one new server to be placed in each data center to host the MEDS components.

Install Hardware

This activity will require close coordination with the staff at the host facilities.

Install and Configure Software

The following software must be installed on the appropriate servers. Assuming that the data centers are the preferred hosting solution, some of this software will already be in place:

- **Data Repository**
 - Relational Database for vector data storage(Oracle 10g or SQL Server)
 - Postgres SQL 8.4 with PostGIS for Windows
- **Data Services**
 - ArcServer 9.3 (for WMS, WFS and WCS)
 - Google Fusion
 - Google Earth Server
 - Microsoft IIS with port 80 open
- **Website**
 - Drupal 5.2 for Windows
 - Apache 2.2 for Windows. An open port is needed for the web server.
 - Python 2.5 for Windows
 - PostgreSQL 8.4 for Windows
 - PHP 5 for Windows
 - Joomla for content management
- **Application Programming Interfaces (APIs)**
 - Sun Application Server 9.x for Windows (open source application server)
 - Glassfish Web Server 3.x for Windows (open source web server)
- **Data Distribution**
 - Any FTP software that allows secured FTP access.

Compile and Pre-Process Geospatial Data

NAIP Imagery

High Resolution Urban Imagery

TIGER Transportation

GNIS Landmarks

Parcel Points as Landmarks

Load Geospatial Data to MEDS Data Repository

Build WMS, WFS, and WCS from MEDS Data Repository

Build WMTS from MEDS Data Repository

Build APIs to leverage WMTS

Build Sneakernet Update Mechanism

Establish FTP Site for Alternate Access

Build Bi-directional Notification System

Implement Load Balancing

Build Google Earth Disconnected Deployment

Build Drupal Website and Wrapper

2.2 Data to be Processed

2.2.1 Landmarks

GNIS data will be downloaded from the USGS and can be loaded into the relational database with minimal processing. The parcel dataset from the California Board of Equalization (BOE) does require additional processing. Data from BOE is available as polygon data; parcel centroids (points) must therefore be generated by the MEDS Implementation team. Attribute data from the polygons must be preserved in the appropriate parcel points. The parcel points must then be loaded into the relational database by the Implementation team.

2.2.2 Transportation

The processing of MEDS transportation data is relatively straight-forward. TIGER data will be downloaded from the US Census, processed, and loaded into the relational database. TIGER data is available on a county basis, therefore the Implementation team will be required to download or otherwise acquire TIGER data for each of the 58 counties in California and assemble the data into a seamless layer for California. The seamless TIGER layer must then be loaded into the relational database by the Implementation team.

2.2.3 Imagery

NAIP and High Resolution Urban Area source imagery will be obtained. To efficiently support delivery of imagery via Web 2.0 technologies, the NAIP and High Resolution Urban Area source imagery must be split into tiles and stored in a standardized file structure. While much of this processing can be scripted, a not insignificant investment of labor is required to manage the process.

2.3 Data and Application Hosting Agreements

MEDS will leverage existing infrastructure investments within California to the extent possible. To provide for a scalable and robust MEDS solution, mirror sites are recommended. To that end, MEDS data and applications will be hosted by a consortium of partners.

2.3.1 Data Centers

The State of California is fortunate to be the site of world-class computing centers in the NASA Ames Research Center at Moffett Field and the San Diego Supercomputer Center (SDSC) in La Jolla. Throughout this project the MEDS project team has held discussions with key staff in these data centers with the objective of potentially including the data centers in the proposed architecture. The data centers can provide several benefits, including access to large, managed disk farms and reliable, high capacity internet connections. For these reasons, use of the data centers as primary locations for MEDS is recommended.

The model for basing some or all MEDS components at the data centers can be best characterized as a collocation (COLO) strategy. The MEDS project would purchase servers to be housed at the centers. To include the data centers in the MEDS implementation, several issues will need to be negotiated between the centers and the State. COLO requirements are not identical between the two centers. NASA Ames needs to nominally own the servers, while SDSC does not have this requirement. Costs for use of data center facilities and staff time will need to be negotiated and agreements will need to be executed between the agencies.

The data center staff members that have been involved in MEDS are strong open source proponents. PostGRES Spatial Extension, Drupal, Apache and FTP are all supported by both centers. Neither center currently has ArcServer as a system level service, though SDSC does have “project-level” instances to support specific projects or their GIS Lab. Both data centers indicate that running software they might consider “non-standard” on COLO equipment is not an issue.

2.3.2 State Agencies

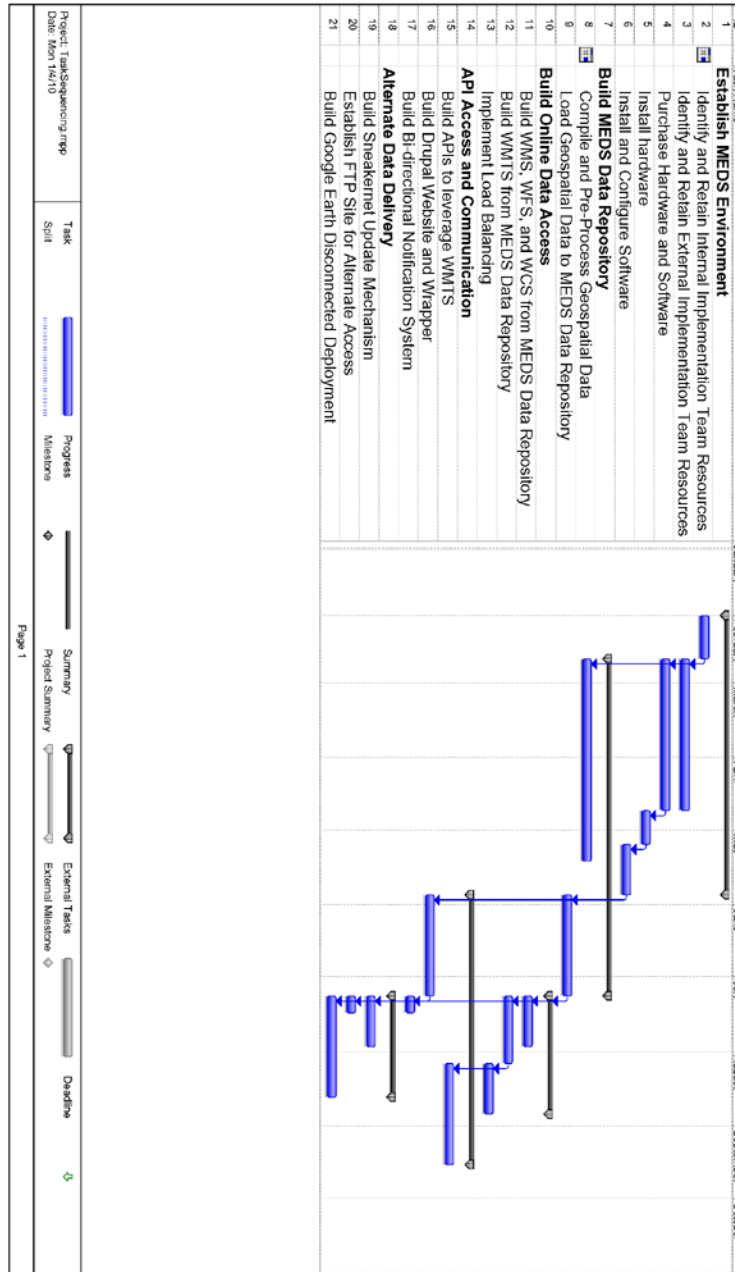
We anticipate that one or more state agencies may serve as a mirror site for MEDS or for portions of the MEDS datasets (such as vector landmark and transport features). Many of the same administrative issues discussed for the data centers will also need to be addressed with any participating state agencies.

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2.4 Implementation Schedule

The DHS grant funds used by the OCIO to fund the implementation of MEDS must be expended prior to October 1, 2010 and this date drives all other project scheduling. The tight timeframe will require parallel activities to build the infrastructure, process the three MEDS data sets, and develop basic APIs to enable use of the data by Web 2.0-based tools. The schedule shown below is intended to indicate general sequencing of tasks only.



3 Project Administration

3.1 Communication Plan

Communications are expected to be very open between the selected Implementation team (s) and the Office of the State Chief Information Officer's (OCIO's) staff.

Technical Discussions – Technical discussions between Implementation team members and the OCIO's staff are encouraged. Written notes summarizing the discussions will be provided to the OCIO PM, summarizing decisions made, directions to be taken, etc.

E-mail – Vendor team members will copy the vendor Project Manager on all e-mail correspondence for additional distribution and archiving if necessary.

Client Correspondence – Correspondence to the OCIO will be under the Project Manager's signature and will be addressed to:

Mr. Mike Byrne
Office of the State Chief Information Officer
Deputy Director – Geographic Information Officer
1325 J Street, Suite 1600
Sacramento, CA 95814

Or

Mr. Scott Paterson, PMP
Office of the State Chief Information Officer
1325 J Street, Suite 1600
Sacramento, CA 95814

Invoices – Vendor invoices will be submitted to Mr. Scott Paterson and copied to Mr. Mike Byrne.

Internal Team Meetings – Implementation staff will hold an internal kickoff meeting. Subsequent meetings will be scheduled based on the activities under way. Team meetings will be documented.

Client Coordination Meetings – The Implementation team Project Manager (PM) will participate in weekly, monthly and ad-hoc meetings with the OCIO team via phone. The Implementation team PM will be available for face-to-face meetings as necessary.

Status Reports – The Implementation team PM will complete weekly and monthly Status Reports and submit these to the California PM on the month-end closing date. All reports will be sent to the California PM via email, in PDF format.

Weekly reports will include percent complete for Tasks and Milestones/Deliverables, will identify risks, issues, and obstacles and will identify tasks for the upcoming week. The monthly reports will be a rollup of the weekly reports with a focus on percent complete for Tasks and Milestones/Deliverables, will identify risks, issues and obstacles and will identify tasks for the upcoming month.

The Implementation team PM will immediately communicate to the OCIO PM and GIO any changes to the project schedule. The CA PM and GIO must approve any schedule changes that will affect deliverable dates.

3.2 Project Procurement and Subcontracting

The OCIO must approve any subcontractors.

Key Implementation team staff must be clearly identified and resumes must be submitted. Any change to key vendor staff must be approved by the OCIO.

3.2.1 Payment Schedule

Invoices will be submitted upon completion of each Deliverable in the Cost Table. Invoices will not be submitted more than once per month.

3.3 Change Management

The Implementation team PM will identify any work that is out of scope and will supply estimated costs associated with that work to the OCIO Project Manager. The vendor team will not work on any out of scope work without prior written approval of the OCIO PM, approval from vendor management and written agreement on the scope, schedule and cost of out of scope items.

3.4 Safety and Occupational Health

This project will be performed in the office, following normal office safety procedures.

3.5 Closeout Plan

The following items will be performed at the end of the project:

- All electronic files will be reviewed and sorted. Unnecessary files will be deleted; all others will be archived appropriately.
- All hard copy documents will be reviewed and sorted. Unnecessary documents will be discarded; all others will be archived appropriately.
- A final invoice will be prepared and submitted to the OCIO.

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4 Glossary

Term	Definition
API	Application Programming Interface
BOE	Board of Equalization
COLO	Co-location
FTP	File Transfer Protocol
GIO	Geographic Information Officer
GNIS	Geographic Names Information System
HTTP	Hyper Text Transfer Protocol
MEDS	Minimum Essential Datasets
NAIP	National Agricultural Imagery Program
OCIO	Office of Chief Information Officer
OGC	Open GIS Consortium
PM	Project Manager
RSS	Really Simple Syndication
SDSC	San Diego Supercomputer Center
Sneakernet	The transfer of electronic information, especially computer files, by physically carrying removable media such as magnetic tape, floppy disks, compact discs, USB flash drives, or external hard drives from one computer to another
TIGER	Topologically Integrated Geographic Encoding and Referencing
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WMTS	Web Map Tile Service